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EXAMINER

KILDAY, LISA A

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 04/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/825,612

Applicant(s)

SHARAN ET AL.

Examiner

Lisa A Kilday

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-18, 22-26 and 28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-18, 22-26, 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

22-28 LK (11/17/03)
Claims 13-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang (6,294,466). In re claim 13, Chang discloses in fig. 1 a method of making a semiconductor device, comprising the steps of: forming a product in a PECVD chamber (36) through an interaction of a chemically inert charged species producer gas (col. 11 lines 31-32, ref. 100d) and a metal-containing compound (col. 11 lines 33-36, ref. 100a) in a plasma (col. 11 lines 42-44) and exposing a substrate (54) to said product.

In re claim 14, Chang discloses wherein said step of forming a product comprises forming a product free of constituents of said chemically inert charged species producer gas (col. 11 lines 51-53).

In re claim 15, Chang discloses wherein said step of exposing a substrate to said product further comprises forming a metal layer free of constituents of said chemically inert charged species producer gas (col. 11 lines 51-53).

In re claim 22, Chang discloses a method of performing a back-end-of-the line process comprising: providing a semiconductive device (54) under fabrication; placing

said device in a vacuum chamber (36); supplying a metal source gas (100a) and a chemically inert-excitation gas (100d) within said vacuum chamber; and interacting said metal source gas and said chemically inert gas (col. 11 lines 42-44).

In re claim 23, Chang discloses wherein said step of interacting comprises igniting a plasma (col. 1 lines 64-67).

In re claim 24, Chang discloses a making a semiconductor device using PECVD comprising: providing a semiconductor device (54) under fabrication; placing said device in a vacuum chamber (36); forming combined gases comprising a metal source gas (100a) with a chemically inert energy-transfer gas (100d); supplying said combined gases to said vacuum chamber; and igniting a plasma (col. 1 lines 64-67).

In re claim 25, Chang discloses wherein said step of igniting a plasma comprises interacting said combined gases (col. 1 lines 64-67).

In re claim 26, Chang discloses wherein said step of interacting said combined gases comprises producing a charged species (col. 1 lines 59-67 – col. 2 lines 1-8).

In re claim 28, Chang discloses a semiconductor processing method comprising the following steps: providing a semiconductor wafer (56); subjecting said wafer to PECVD conditions in a chamber (col. 1 lines 57-65); forming an ionized reactant species by interacting a metal source material (100a) with a chemically inert collider gas (100d) in said chamber (col. 2 lines 1-8); and forming a metal-containing layer on said wafer from said ionized reactant species (col. 14 lines 28-43).

Claims 16-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Chang in view of Muller and Kamins, "Device Electronics for Integrated Circuits", John Wiley and Sons, pg. 102.

In re claims 16 & 17, Chang discloses wherein said step of forming a product further comprises forming a metal-containing ion of said metal-containing compound (col. 11 lines 51-53, col. 2 lines 1-8). The method of Chang interacts a chemically inert charged species producer gas and a metal-containing compound in a plasma, which is inherently forming a metal-containing ion and metal-free ion from said metal-containing compound (see Muller and Kamins, pg. 102).

In re claim 18, Chang discloses further comprising a step of introducing a reactant gas (col. 6 lines 27-28) to said metal-containing ion; and wherein said step of exposing a substrate to said product comprises exposing said substrate to said product and said reactant gas (col. 11 lines 29-40, col. 1 lines 57-65).

Response to Arguments

Applicant's arguments filed 1/21/03 have been fully considered but they are not persuasive. Applicant's representative argues that Chang (6,294,466) fails to disclose a gas that functions as a chemically inert charged species producer. This point is moot for five reasons. First, plasma means charged gas. Second, Chang discloses in col. 6 lines 11-24 that RF power is used to charge species. Third in PECVD, you have to ionize gas in order to deposit and hit target. Fourth, the Argon plasma breaks down TiCl_4 prior to deposition of Titanium. Finally, Argon is chemically inert and does act as a charged species producer (col. 11 lines 30-32).

Applicant's representative asserts that claim 13 requires an interaction "of that gas and a compound." This limitation is moot because Chang discloses in figure 1 Argon (100a) as the chemically inert charged species producer gas interacting with a metal-containing compound, in this case, $TiCl_4$ (100d), (col. 11 lines 31-36).

Applicant argues on the top of pg. 2 that Chang does not disclose several gases such as: chemically inert-excitation gas, chemically inert energy-transfer gas, and a chemically inert collider gas. This point is moot because the previous terms are interchangeable words that refer to the same gas, namely, chemically inert charged species producer gas found in claim 13. This point was addressed in ¶ 1 of the *Response to Arguments*. Although, the applicant may act as his or her own I lexicographer, he should not repeat arguments based on identical language. Support for my reasoning is found in the specification: ¶¶ 29-31, 42.

Applicant's representative argues that Chang discloses that its plasma forming gas may or may not include a flow of an inert carrier gas, such as Argon is moot for the following reasons. First, the applicant admits that Chang discloses that Argon is an inert gas included with the plasma-forming gas. Second, the limitation that a plasma forming gas may or may not include a flow of an inert carrier gas, such as Argon is not in the claims. The claims do not recite this limitation. Applicant's point is moot because this limitation is not in the claims. Furthermore, the claims use "comprising" language. Therefore, applicant's method does not preclude the use of other inert carrier gases.

Applicant's representative further goes on to make *assumptions* that Change does not express Argon as a charged species producer (or other analogous terms:

excitation gas, energy-transfer gas, or collider gas). Applicant's representative assertion that the method of Chang does not include Argon as a charged species producer is merely a conclusory observation by the applicant's representative and not supported by evidence. See MPEP 2145. The second reason is that Chang discloses Argon as a charged species producer (abstract, col. 6, lines 20-31; col. 11, lines 29-32). The third reason the applicant's point is moot is because this limitation is not in the claims.

Applicant's representative argues that Chang fails to disclose that RF energy forms plasma. This point is moot because this limitation is not in the claims.

Applicant argues that it is unclear whether Chang considers Argon to be a process gas. This point is moot because this limitation is not in the claims.

Applicant argues that Chang in claims 13-15 fails to disclose that its Argon functions as a charged species producer. This point is moot because the limitation of Argon as a charged species producer is not in the claims. This point is moot for the following five reasons. First, plasma means charged gas. Second, Chang discloses in col. 6 lines 11-24 that RF power is used to charge species. Third in PECVD, you have to ionize gas in order to deposit and hit target. Fourth, the Argon plasma breaks down TiCl_4 prior to deposition of Titanium. Finally, Argon is chemically inert and does act as a charged species producer (col. 11 lines 30-32).

Conclusion

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0957. See MPEP 203.08.

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Any inquiry concerning this communication from the examiner should be directed to Lisa Kilday whose telephone number is (703) 306-5728. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo, can be reached on (703) 308-1233. The fax number for the group is (703) 305-3432. MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.

Lisa Kilday

LAK

3/20/03



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